

Water Infiltration and Irrigation Calculations

Infiltration is the rate of water movement into the soil. Typical infiltration rates for four soil types are listed in Table 1. This table provides a rough idea of the rate you can use for your irrigation system before water begins to run off instead of being absorbed by the soil. These rates should not be exceeded as the extra water drains off and is wasted. Clay soils have infiltration rates that are 4 to 20 times slower than sands. Of course, this will change after amendment, but a sandy soil will always have a higher rate of infiltration compared to clay.

A second important issue concerning irrigation is how long it takes for the water to drain from the soil, allowing oxygen to return. Without adequate drainage between irrigations, there will be little oxygen in the soil. A clay soil will take longer to drain and re-aerate than a sandy soil. Bedding plants grown in a clay soil that has been properly watered may not have to be watered more than once a week. This will vary with time of year, sun or shade, plant growth, and other environmental factors. However, bedding plants grown in a sandy soil may have to be watered 2 to 3 times a week. Subsoil compaction or the presence of a hard pan beneath the bed can also affect water drainage and soil aeration. It may be necessary to deep till beds to break up the subsoil and increase drainage rate.

Bedding Plant Nutrition

Compared to woody plants, bedding plants have very limited root systems so it is critical that nutrients (excluding nitrogen) be distributed uniformly throughout the soil. This requires planning prior to bed preparation to determine what nutrients are needed and in what quantity.

A soil test is the only way to determine if phosphorus, potassium, calcium, or magnesium must be added or if a pH adjustment is needed. Without a soil test, any application of fertilizer could be detrimental to the landscape. Overapplication or application of unneeded

Table 1. Typical infiltration rates for 4 common soil types.

Soil type	Infiltration rate (inches/hour)		
Sands	> 0.8		
Sandy & silty soils	0.4	to	0.8
Loams	0.2	to	0.4
Clay soils	0.04	to	0.2

materials could result in salt injury to plants, cause nutrient imbalances unsuitable for plant growth, and is environmentally unsound. Contact your county extension agent for soil sampling boxes and proper sampling procedures. Soil samples should be taken after amendments to improve aeration and/or drainage have been incorporated into the beds. If test results indicate nutrient or pH adjustments are needed, follow the application recommendations given below.

Phosphorus and calcium move very slowly through the soil profile so to be most effective they should be incorporated into the top 6 to 10 inches. These elements can be surface applied but the nutrients will not be as readily available to the plants and will be less effective. It is impossible to tell how much calcium and phosphorus are required without a soil test. However, because most North Carolina soils are low in phosphorus, it is usually safe to add 1 to 2 lbs of P_2O_5 per 1000 ft². For soil incorporation of phosphorus, triple superphosphate (0-46-0) is recommended. For 1 to 2 lbs of P_2O_5 , incorporate 2 to 4 lbs of triple superphosphate per 1000 ft² of bed area. Diammonium phosphate (18-46-0 or 16-48-0) is the most soluble phosphorus source and should be used if phosphorus is applied to the surface. For 1 to 2 lbs P_2O_5 , apply 2 to 4 lbs of diammonium phosphate per 1000 ft² of bed area. This will also supply 0.4 to 0.8 lbs of nitrogen per 1000 ft².

Guessing at the amount of calcium to apply without a soil test is inadvisable, for two reasons. First, it is possible to get too much calcium in the soil which can lead to potassium and magnesium deficiency, and second, many sources of calcium